

**Case 3495*****Chionobas chryxus* Doubleday, 1849 (currently *Oeneis chryxus*; Insecta, Lepidoptera, NYMPHALIDAE): proposed conservation of usage by designation of a neotype**

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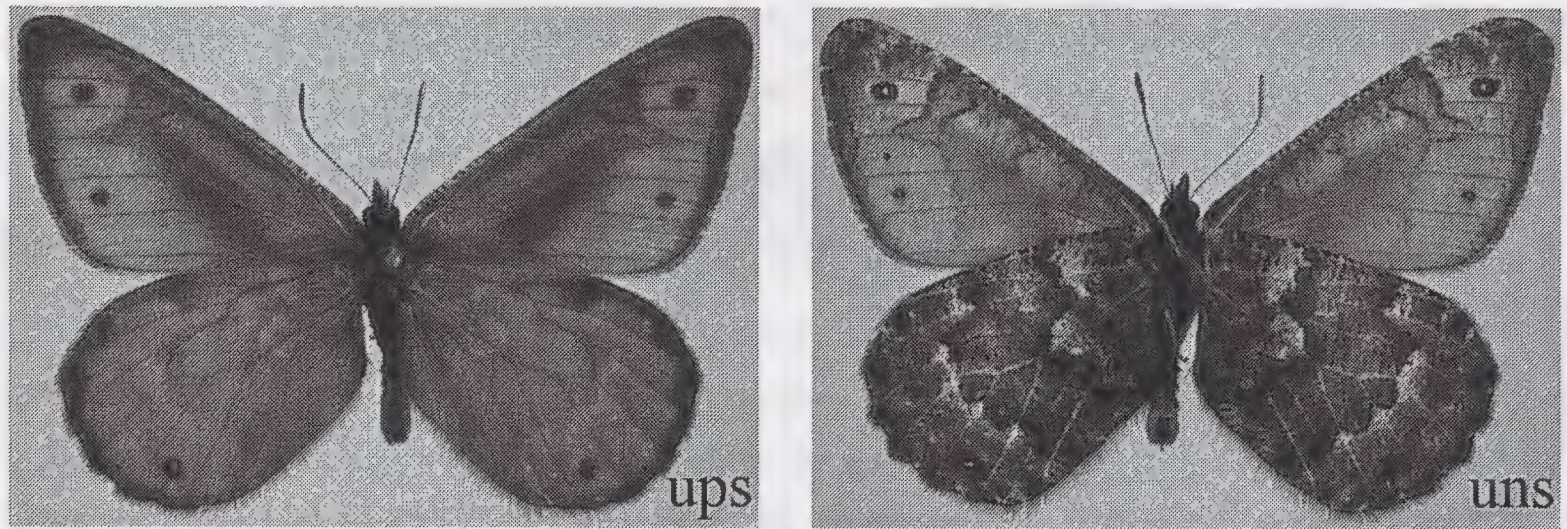
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**Abstract.** The purpose of this application, under Article 75.5 of the Code, is to conserve the usage of the name *Chionobas chryxus* Doubleday, 1849 (currently *Oeneis chryxus*) in its original and accustomed usage for a nymphalid butterfly from the Rocky Mountains by designation of an identifiable neotype. *Chionobas chryxus* Doubleday 1849 (currently *Oeneis chryxus*) was described and figured from a male specimen which has since been lost. The original figure perfectly matches males of one of the two species into which the species was later divided. In 1984 a female specimen was designated as lectotype but the lectotype lacks adequate locality data and is a female so cannot be determined as either of the two segregate species, and the validity of this designation under Article 72.4.1.1 of the Code is unclear. It is proposed that all previous type fixations for the species *Chionobas chryxus* be set aside and a male specimen identifiable as the species proposed in the original publication be designated as neotype.

**Keywords.** Nomenclature; taxonomy; Insecta; Lepidoptera; NYMPHALIDAE; *Oeneis*; *Oeneis chryxus*; *Oeneis calais altacordillera*; nymphalid butterfly; Rocky Mountains.

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1. *Chionobas chryxus* (currently *Oeneis chryxus*) was established (Doubleday, 1849, pl. 64, fig. 1) in the caption '1. CHIONOBAS CHRYSXUS Doubleday' printed at the bottom of a plate showing a colour engraving of the upper side of a male. Authorship of the name *chryxus* has often been listed as Doubleday & Hewitson because W. Hewitson produced the illustration, and Butler (1868) listed only Hewitson as the author, but Article 50 makes it clear that the person who publishes the name is the author; publication of the name in association with an illustration confers availability on the name (Article 12.2.7) but does not affect authorship. Doubleday wrote the entire Vol. 1, in which this plate appeared, so was the author (Hemming, 1941). The engraving, which was reproduced in colour by Kondla et al. (2006, pl. IV), obviously represents a male, because the large brown patch on the dorsal forewing is the male stigma and the forewing is narrow and pointed. This engraving is not a chimera combining several different specimens but accurately depicts a male specimen of the twig-ovipositing species discussed in para. 9 below and there were no other specimens of *Chionobas* like it in the museum at that time (see para. 4, below). Forewings of females are very different from those of males (more rounded, mostly orange, lacking the wide brown streak and stigma and with an extra eyespot); any engraving that combined male and female features would be instantly recognisable as such.



**Fig. 1.** Proposed neotype of *Chionobas chryxus* (a male from Rock Lake (~32 air km WNW Hinton), Alberta, July 15, 1989, collected by Norbert G. Kondla and deposited in the Canadian National Collection (CNC) in Ottawa). Label: "1989-7-15 AB, Rock Lake, NG Kondla, topotype". Total wingspan of spread specimen is 52 mm. Forewing chord/radius 'length' is 29 mm.

2. Westwood (1851) authored volume 2 of the same work, wherein he presented only this simple text concerning *C. chryxus* in a two-page catalogue of all the species of *Chionobas* known in the world at that time (p. 383): '13. CHION. CHRYSUS./ *Chionobas Chryxus* E. Doubl. MS.; Doubl. Westw. & Hewits. Gen. D. Lep. pl. 64, f. 1./Rocky Mountains, North America. B. M.' Westwood (1851) thus restricted the type locality of *chryxus* to the Rocky Mountains, North America. He listed the engraving that constituted the original publication and listed no other specimens.

3. The male *Chionobas chryxus* in the original engraving, which could not be found in the Natural History Museum, London, was apparently one of three specimens from the 'Rocky Mountains' collected in 1844 and presented in 1845 (Shepard, 1984), listed by Doubleday (1848, Appendix, p. 31) with this entry: '*Chionabas* —?/a–c. Rocky Mountains, North America. Presented by the Earl of Derby.' [In this Appendix, *Chionobas* is misspelled.] The '—?' in this listing needs to be explained. In the introduction to the main part of this same book, Gray (1845) states, '... the different individuals of each species contained in the collection are indicated by the letters a, b, & c, following the name of the species, and its synonymes [sic].' Most of the entries in the main part of the book and about half of those in the Appendix, represent specimens identified to genus and species, but about half the entries in the Appendix contain a generic name followed by '—?', which clearly indicates that the specimens involved were unidentified at least as to species and perhaps simply undescribed. Multiple entries of single generic names followed by '—?' appear, e.g., the two entries for *Limnas* received from Venezuela from Mr. Dyson evidently belonging to two different species. The manner of listing *Chionobas* suggests that Doubleday considered all three specimens ('a–c') to belong to one species. Inspection of the collections in the Natural History Museum, London (NHM) by R.M. Pyle (in Shepard, 1984, p. 42) and A.G. Gabriel (in Ehrlich, 1955, p. 181) showed that Doubleday (1848) missed listing some individuals of at least five species of butterflies that had been donated to the British Museum (now Natural History Museum, London (NHM)) in 1845 by the Earl of Derby. An entry in the Accessions Books of the NHM lists 50 Lepidoptera from the Rocky Mountains donated then by him yet only 21 are listed by Doubleday (1848); and butterflies from the Rocky Mountains donated in 1847 by him are missing from the Accessions Books; and some specimens of four species reported to have been donated by him according to Doubleday (1848)

are now missing. The lack of complete correspondence between the specimens known to be in the museum and the inventory of Doubleday (1848), introduces some uncertainty into the inferences drawn in this section of this application, but the three specimens of *Chionobas* donated in 1845 can all be accounted for by the male engraving and two existing females collected in 1844 and presented in 1845 (see next paragraph).

4. None of the three other entries for species of *Chionobas* in Doubleday's (1848) Appendix, nor four other entries for other congeneric species in the main text of Doubleday (1848, p. 123), pertains to any species of *Chionobas* that looks similar in either the male or female to *Chionobas chryxus*. It is therefore assumed that the male *C. chryxus* in the original figure was one of the three specimens mentioned in para. 3 above from the Rocky Mountains, presented by the Earl of Derby. Under Article 72.4.1.1, the listing by Doubleday (1848) of three specimens may be taken into account in considering whether his original type series of *C. chryxus* included other specimens besides the originally illustrated male of 1849.

5. The male specimen that we infer provided the basis for the original publication of *Chionobas chryxus* by Doubleday (1849) has not definitely been seen since 1849. It was not listed in the collections of the British Museum by Riley & Gabriel (1924), and Shepard (1984) wrote that it had been lost. In 2009, Blanca Huertas (curator of Lepidoptera) searched for some of Doubleday's relevant type specimens; after examining the registries and collection she confirmed that no other specimens of *C. chryxus* apart from the two supposed syntype females photographed by Shepard (1984) (see paras. 7–8 below concerning their nomenclatural status) are in the NHM Lepidoptera collection. Doubleday might have placed the missing original *chryxus* male in his own collection, which was later sold and dispersed so the specimen may now be destroyed or unrecognisable (John Calhoun, pers. comm.). It might also have been discarded by curators in the British Museum prior to 1924 when Riley & Gabriel catalogued and published an inventory of the butterfly types (the Introduction to Riley & Gabriel (1924) stated that some types had been discarded, probably because they were imperfect). As Doubleday died in 1849, if the original male was retained by Westwood after being illustrated by Hewitson, it might have gone to the Hope Collections in Oxford with Westwood's collection. However no specimens were found in these collections although a space was laid out for the species. 'There are no pin-holes in this part of the drawer which suggests we have never held this species at Oxford.' (J. Hogan, pers. comm.). Calhoun notes that it may have been transferred to the collection of the Entomological Club prior to Doubleday's death, but this collection was sold and dispersed. It is not in World Museum Liverpool (The National Museums Liverpool), which never received any invertebrates in 1851 when the museum opened, and now has no invertebrates from the Earl of Derby (Guy Knight and Clemency Fisher, pers. comm.). Most likely, the male was lost when it was removed from the British Museum collection to be illustrated by Hewitson, and was never returned to the collection (John Calhoun, pers. comm.). Other specimens illustrated by Doubleday (1849) on the same plate as *C. chryxus* were not lost (the specimen illustrated on plate 64, fig. 2 was designated lectotype of *Erebia mancinus* Doubleday by Shepard (1984)).

6. Narrower specification of the type locality of *C. chryxus* than 'Rocky Mountains' is difficult. Shepard (1984, pp. 37–41) restricted the type locality of six species

named by Doubleday including *C. chryxus*, and represented in the Natural History Museum by specimens with labels stating 'Rocky Mountains', to Rock Lake, Alberta, Canada, because historical records suggest that they were collected by the Earl of Derby's collector Joseph Burke in 1844 at or near Stony Lake near Jasper House, now renamed Rock Lake. Three of those species do not occur south of Alberta. Shepard noted, though, the possibility that *C. chryxus* and several other species were collected by Burke in 1845 in the area from Fort Hall in SE Idaho to the Platte River in Wyoming. The two females of *C. chryxus* now in the museum were collected in 1844 and presented in 1845 so were probably from Rock Lake, but the missing male might have been collected in 1845 in Idaho/Wyoming and presented to the museum in 1847. Ehrlich (1955, p. 181) wrote that four other butterfly species presented by the Earl of Derby must have been collected from central Wyoming in U.S.A. to Jasper National Park in the Canadian Rockies, with 'a little better evidence for the eastern side of the divide in the Canadian Rockies north to Jasper.' There is no way of knowing whether these and other Earl of Derby specimens (more than 50 in all) originated from the same locality. Another possible, but unlikely, source of the three specimens of *Chionobas* listed by Doubleday (1848) was the English botanist Thomas Nuttall (John Calhoun, pers. comm.), who crossed the Rocky Mountains in Wyoming and Idaho in 1834 and returned to England in 1841 to settle near the home of the 13th Earl of Derby. However, if Nuttall then passed the specimens to him, the Earl might have presented them to the British Museum (Natural History) as early as 1843, whereas the two females of *C. chryxus* now in the museum have labels indicating they were received in 1845 (para. 8 below).

7. In their list of types of Lepidoptera in the British Museum, Riley & Gabriel (1924) identified one of the above-mentioned female specimens of *C. chryxus* from the 'Rocky Mountains' as a type, and they also labeled it as 'TYPE No. Rh3845' (they missed the second female found by Shepard 1984). In their publication, it was listed as '3845. **chryxus**, *Chionobas* Doubl., Westw., & Hew., Gen. D.L., 2./p. 383, pl. 64, f. 1. 1851♀'. This did not constitute a lectotype designation because the conditions of Article 74.3 were not met (it was just in a list of all the museum's types, which was not intended to designate lectotypes for any taxon). The labels on the specimen do not constitute a type designation either (Article 72.4.7).

8. Shepard (1984, p. 42) explicitly designated the same female specimen as the lectotype (lectotype 3845; illustrated in that work and also by Kondla et al., 2006) because 'Doubleday did not label type specimens and thus lectotypes need to be selected.' Kondla et al. (2006) regarded this lectotype designation as invalid, because they thought that the male in the original engraving was the holotype by monotypy. The specimen chosen by Shepard has six labels, arranged from old to new: (1) an old brown circular label with the barely legible, hand-printed scrawl 'Rocky Mts.' on the upper side and '45-136' on the underside; this label was the only original label, and was the same as the only label present on the other female; this label was present in 1984 but is now missing. The numbers '45-136' are the date and number from the Accessions Books record and indicate that it was accessioned by the museum in 1845. The other five labels were placed on the specimen after the publication of the name *chryxus*: (2) a less-old slightly-brownish, long rectangular label with hand-printed 'Rocky Mts. 45-136' on the upper side and 'chryxus. Doubl. Hew. This spec. agrees best. w. figure of type.' on the underside, and a hand-printed ♀ on the upperside of

a small, rectangular tag glued to one end of the label over the 'ryx' letters in 'chryxus' (this label was most likely affixed by Butler (1868)); (3) a newer nearly-square label with 'B.M. TYPE No. Rh3845 Chionobas chryxus D.W.& H. ♀' ('B.M. TYPE No. Rh' printed, the rest hand-printed); this label was evidently affixed by Riley & Gabriel in the early 1920s and they may have affixed the tag to label 2 (John Calhoun, pers. comm.), although the latter is quite brown; (4) a newer slightly-brownish circular label with a tawny-orange rim, with the word '?Type' ('?' hand-printed, 'Type' printed) (this label is evidently relatively recent and was present in 1984); (5) a large, red-paper label with hand-printed 'Lectotype of Chionobas chryxus Doubleday, designated by Jon H. Shepard, 1983'; (6) a new circular label with a blue rim with LECTO-TYPE printed; this label is new since 1984.

9. The two *Oeneis* (*Chionobas*) species involved now have disputed names. The nominal species *Oeneis chryxus* (Doubleday, 1849) was thought to range from the Rocky Mountains of western North America across most of Canada, until it was found to include two separate species that are sympatric at middle altitudes in the Rocky Mountains (Scott, 2006). One species referred to as *O. chryxus* by Kondla et al. (2006) occurs at lower altitudes throughout the Rocky Mountains. It oviposits on twigs at the base of conifer trees, and the larvae fall on and eat *Carex* turf growing beneath the tree, where the shade slows larval growth and produces a biennial life cycle; adults mate on hilltops. The engraving in Doubleday (1849) is an excellent representation of the male of this twig-ovipositing species, and for this reason Kondla et al. (2006) used the name *O. chryxus* for this species. The other Rocky Mountains species, *O. calais altacordillera* Scott, 2006, mostly occurs at higher altitudes and oviposits on grasses/sedges away from trees so can occur at colder high altitude even on tundra (it is also biennial); adults mate in swales. If Shepard's (1984) lectotype designation is valid after all, on the presumption that the two females in the Natural History Museum were known to Doubleday and recognized by him as belonging to *O. chryxus* at the time the original engraving was published (Article 72.4.1.1 and its Example), then the name *altacordillera* may be a synonym of *chryxus*. Although females of the two taxa are more-or-less indistinguishable (Scott, 2006), Kondla et al. (2006) wrote that Shepard's female lectotype is more likely to be conspecific with *altacordillera* than with *chryxus*. They stated, though (p. 23) that 'females are not very good for identification, so that purported lectotype isn't much help in determining the identity of *chryxus*.' If the lectotype of *O. chryxus* is considered to be conspecific with *O. calais altacordillera*, then the twig-ovipositing species will be left without a name, resulting in nomenclatural instability.

10. Two contrary interpretations of the type series of *Chionobas chryxus* in the literature may be differentiated. Either there is a holotype by monotypy (the now lost male specimen, the existence of which is only inferred from the precise match of the image in the original engraving to one of the two *Chionobas* species), or there is a type series consisting of the three specimens listed as *Chionobas* —? in the Appendix of Doubleday (1848), in which case Shepard's (1984) lectotype designation is valid. Article 72.4.1 states 'The type series of a nominal species-group taxon consists of all the specimens included by the author in the new nominal taxon (whether directly or by bibliographic reference), except any that the author . . . doubtfully attributes to the taxon.' The original publication (Doubleday, 1849) *directly* included in *C. chryxus* only the specimen(s) (presumably a single male) depicted in the engraving. As

has been noted, Shepard (1984) found only two females from the Rocky Mountains in the Natural History Museum, and because Doubleday (1848) listed three, the illustration is inferred to have been based on the third one. Article 72.4.1.1 states, 'For a nominal species or subspecies established before 2000, any evidence, published or unpublished, may be taken into account to determine what specimens constitute the type series.' An Example is provided wherein specimens known to Linnaeus and recognised by him as belonging to a particular species are included in the type series of that species despite their not being cited in Linnaeus (1758). In the present instance, because Article 72.4.1.1 is numbered and indented as subservient to 72.4.1, it seems that the search for unpublished evidence allowed by Article 72.4.1.1 must be limited to the specimen or specimens that might have been the model(s) for the original engraving, possess appropriate collection data, and were available to Doubleday. If more than one such specimen were found, all could be considered to be syntypes. The only specimens found with a 'Rocky Mountains' label at the Natural History Museum are two individuals that differ considerably from the original engraving (because they are females, and perhaps a different species). These were probably two of the specimens identified only as 'Chionabas —?' in Doubleday (1848 p. 31) and are only inferred, but not known for sure, to have been considered conspecific by him with the later illustrated male. Taking the contrary interpretation, one might argue that the lectotype is valid because the female had an original label stating 'Rocky Mts.' and an accession number '45-136' that led back to the specimens donated by the Earl of Derby, which matched Westwood's (1851) listing of *Chionobas chryxus* as from Rocky Mts. and the Earl of Derby, and because that female had been labeled as a *chryxus* type by Riley & Gabriel (1924). Proponents of this opinion must believe that Doubleday (1848) intended that the 'Chionabas —?' entry in his inventory convey information on one and only one species. Inclusion of specimens not mentioned in the original publication is clearly permitted by the cited Example to Article 72.4.1.1, but use of information that merely *suggests* Doubleday considered them all to be conspecific seems to exceed this Article's intention. I do not think these females can be regarded as part of the type series, unless Article 72.4.1.1 is interpreted as independent of 72.4.1. However, Shepard's (1984) designation of the female lectotype was valid under the 2nd edition of the Code in force in 1984.

11. In practice, Shepard's (1984) lectotype of *Chionobas chryxus* cannot be confidently identified as belonging to either of the two species mentioned above (para. 9). Kondla et al. (2006, p. 23) wrote, 'As a practical matter, that (i.e. Doubleday's (1849)) engraving has to be used to define the name *chryxus* because it is a male . . . .' They also wrote that the female lectotype was 'evidently [meaning 'probably'] *altacordillera*', based on its wing pattern, thus was not conspecific with the real type (the specimen in the engraving). But females cannot be used to define either species: unpublished observations by Scott of the females available to Kondla's team and those collected since, which are correctly identified based on their occurrence at sites that have only one of the two species, have shown that individuals like the lectotype occur in both species, so the lectotype cannot be confidently identified. The original lost male and the few specimens of *Chionobas* later collected at Rock Lake in Alberta (the most probable locality of the original male) are of the twig-ovipositing species called *chryxus* by Kondla et al. (2006), and it seems likely that only this species occurs at the original locality. If this is correct, the female

lectotype should be the same species as the lost male, contrary to the suggestion of Kondla et al. (2006).

12. A neotype is needed because: 1) the original male is lost (for details of the search for it, see para. 5); 2) the lectotype designated by Shepard (1984) has no adequate locality data and cannot be identified to species, and thus the correct application of the names of both species is in dispute; and 3) whether the species has a (lost) male holotype or a validly designated female lectotype is debatable as noted in para. 10.

13. A neotype is hereby proposed, a male from Rock Lake (~32 air km WNW Hinton), Alberta, July 15, 1989, collected by Norbert G. Kondla, figured in Fig. 1 and also as 'chryxus Alta. Topotype' by Kondla et al. (2006, Plate IV), which has a large male stigma on the dorsal forewing, with most of the wing orange beyond the stigma, and was found to be the twig-ovipositing species by Kondla et al. (2006). This neotype designation resolves the identity of the twig-ovipositing species as conspecific with the original male, and also preserves the current name *altacordillera* for the meadow-grass-ovipositing species. This neotype belongs to the Rocky Mountains species that has always been named and illustrated as *chryxus* in past literature (only one book illustrated the other species *altacordillera*, as 'Chryxus Arctic (Colorado-high)', Glassberg, 2001, p. 213). The neotype has two labels reading 'NEOTYPE *Chionobas chryxus*, designated by J. Scott & N. Kondla, 2010' and '1989-7-15 AB/Rock Lake/NG Kondla/topotype'. This neotype closely resembles the male *chryxus* depicted in the original engraving, as noted and reproduced by Kondla et al. (2006, pl. IV). (The photo of the copy of the original engraving in the Canadian National Collection shown in pl. IV is a little paler overall than most males of *Oeneis* (*Chionobas*) *chryxus* in Alberta today, but the colour is deeper orange in another copy of the engraving). The neotype comes from the locality thought to be the original locality by Shepard (1984), although as noted in para. 6 the original male might have come from the Rocky Mountains of Wyoming. It is deposited in the Canadian National Collection (CNC) in Ottawa.

14. The International Commission on Zoological Nomenclature is accordingly asked:

- (1) to use its plenary power to set aside all previous type fixations for *chryxus* Doubleday 1849, as published in the binomen *Chionobas chryxus*, and to designate as the neotype the male specimen from Rock Lake Alberta with two labels reading 'NEOTYPE *Chionobas chryxus*, designated by J. Scott & N. Kondla, 2010' and '1989-7-15 AB/Rock Lake/NG Kondla/topotype'; Canadian National Collection (CNC) in Ottawa;
- (2) to place on the Official List of Specific Names in Zoology the name *chryxus* Doubleday 1849, as published in the binomen *Chionobas chryxus* and as defined by the neotype designated in (1) above.

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John V. Calhoun sent copies of old publications and gave valuable historical insights. Gerardo Lamas provided information regarding old publications. Norbert G. Kondla, Nick V. Grishin, Jonathan P. Pelham, Crispin S. Guppy and Jon H. Shepard gave opinions on this case. Blanca Huertas (*Curator of Lepidoptera, Natural History Museum London*) provided photos, searched for possible *Chionobas chryxus* syntypes

in that museum, and searched Accessions Books. Guy Knight (*Curator, National Museums Liverpool, England*) and Clemency Fisher (*Curator of vertebrate zoology, National Museums Liverpool, England*) looked for syntypes in that museum. James Hogan, Oxford, England, looked for syntypes in the Hope Collections at Oxford.

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Comments on this case are invited for publication (subject to editing) in the *Bulletin*; they should be sent to the Executive Secretary, I.C.Z.N., c/o Natural History Museum, Cromwell Road, London SW7 5BD, U.K. (e-mail: iczn@nhm.ac.uk).